PROGRAMMABLE DOPANT FIBER

Abstract: A programmable dopant fiber includes a plurality of quantum structures formed on a fiber-shaped substrate, wherein the substrate includes one or more energy-carrying control paths (34), possibly surrounded by an insulator (35), which pass energy to the quantum structures, said structures including either quantum dot particles (37) on the fiber's surface or electrodes (30) on top of material layers (31) and (32) which form quantum dot devices. The energy passing through the control paths drives charge carriers into the quantum dots (QD), leading to the formation of "artificial atoms" with real-time tunable properties. These artificial atoms then serve as programmable dopants which alter the behavior of surrounding materials. The fiber can be used as a programmable dopant inside bulk materials, as a building block for new materials with unique properties, or as a substitute for quantum dots or quantum wires in certain applications.